

Smoking Room Hazards : A Preliminary Report

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ABSTRACT The objective of this study was to investigate the levels of radon concentration inside the smoking rooms in Bangkok Airport terminals. Radon concentration might be elevated by the radon in tobacco smoke. The findings failed to substantiate the hypothesis and revealed only low and indifferent concentrations of radon both inside and outside smoking rooms. The conclusion reached was that no additional radon concentration was present in the airport terminals' smoking rooms. Nevertheless, the present investigators are not satisfied with the results and have planned to conduct further study with a more efficient methodology to obtain the answer on smoking room hazards.

Key Words: smoking room, airport terminal, Bangkok, indoor radon, polonium-210, health hazards.

A burning cigarette is a miniature chemical factory; one millilitre of cigarette smoke contains 0.3-3.3 billion particles of over 4,000 known chemical compounds, including polonium-210 (a radon progeny)¹ which is a potent tumorigenic agent especially of lung cancer. For smokers in the United States an estimated 390,000 premature deaths

occur each year and more than 10 million Americans experience chronic illness because of smoking-related diseases¹. Another report concluded that environmental tobacco smoke (ETS) is responsible for approximately 3,000 lung cancer deaths per year in US nonsmokers².

Thus, antismoking campaigns have been es-

tablished in almost every country. Thailand is one among the enthusiastic member countries that has implemented strategies to curb smoking. These strategies include the strict banning of tobacco smoking in public places such as in movie theatres, and the provision of limited smoking areas or closed smoking rooms such as those at discrete waiting areas in airport terminals. Such smoking areas accommodate people who crave a few puffs of cigarette before embarking or immediately after disembarking from long flights, where abstinence is forced.

Provision of smoking rooms indulges tobacco addicts and enables nonsmoking travellers to refrain from passive smoking and to avoid the annoyance of unpleasant odour. On the other hand, such provision poses extra-hazards to the smoker occupants through exposure to fairly thick ETS composed of the exhaled mainstream smoke from smokers as well as the side-stream smoke of burning cigarettes which tends to accumulate in such small smoking cubicles. From the hypothesis, the

present group of investigators felt that a pilot study was justified to determine whether radon gas levels in the smoke filled rooms exceeded the safety threshold.

Materials and Methods

In February 1999, measurements of indoor radon were carried out at airport terminals in Bangkok, Thailand. Activated charcoal canisters were used for sample collection and a gamma spectrometer was used for analysis of samples; the details of the technique were the same as those previously described^{4,5}. The radon samples were taken from inside and immediately outside the 17 smoking rooms (Figures 1 & 2). Two canisters were left inside and one outside each room; the same procedure was repeated on three successive days with a total of 153 canisters.

The results were analysed by descriptive statistics and the radon concentrations from inside and outside the rooms were compared by paired-t-test.



Fig. 1 Smoking room



Fig. 2 Smoking room

Results

Table 1 displays the radon concentrations at the 17 sites. The concentration inside each room was determined by calculating the average of the concentrations recorded by the six canisters (two in each room on 3 consecutive days). The concentration outside each room was determined by calculating the average of the concentrations recorded by the three canisters (one per room per day for 3 days). The overall radon concentration inside the 17 rooms was 12.0 ± 2.6 Becquerels per cubic metre (range: 8.69-17.32 Bq.m⁻³) and the concentration outside was 12.8 ± 2.8 Bq.m⁻³ (range: 8.7-17.3). The difference between the radon concentrations inside and outside smoking rooms was not statistically significant ($p=0.418$).

Discussion

The radon concentrations (8.69 - 17.32; 12.8 ± 2.8 Bq.m⁻³) measured outside the 17 smoking rooms located in discrete areas of the Bangkok air terminals may be taken as representative of the usual background radon concentrations inside the air terminals. The figures were well below the safety threshold levels (148 Bq.m⁻³) established by the United States Environmental Protection Agency (US EPA)⁶.

Considering the fact that cigarette smoke contains some radon, the results of comparing gaseous radon levels measured inside and outside smoking rooms (Table 1) are quite bizarre. The conclusion of this pilot study will have to wait until further investigation is conducted in order to obtain more findings to substantiate the hypoth-

Table 1 Radon concentrations (Bq.m⁻³) of the 17 measurement sites.

Sites no.	inside	outside
1	12.08	14.43
2	8.51	13.28
3	11.64	8.80
4	10.59	16.07
5	14.76	10.23
6	13.18	17.32
7	11.41	8.69
8	11.74	11.69
9	13.24	14.95
10	15.66	9.42
11	10.50	17.28
12	12.94	11.33
13	11.46	13.84
14	18.47	14.46
15	11.38	11.16
16	8.68	10.74
17	8.47	13.68
Overall	12.0 ± 2.6	12.8 ± 2.8

esis of smoking room hazards.

Nevertheless, at this point it may be concluded that indoor radon concentrations at Bangkok air terminals are well below the safety threshold. People who occupy the smoking rooms should be safe regarding radon risk.

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บทคัดย่อ

สิ่งคุกคามในห้องพักสูบบุหรี่: รายงานเบื้องต้น

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วารสารเวชศาสตร์สิ่งแวดล้อม ๒๕๔๒; ๑:๒๔๗-๕๐.

การศึกษานี้มีจุดมุ่งหมายเพื่อสำรวจสิ่งคุกคามในห้องพักสูบบุหรี่ที่อาจเกิดจากก๊าซเรดอนในควันบุหรี่. คณะผู้รายงานได้เก็บตัวอย่างอากาศภายในอาคารทำอากาศยานกรุงเทพ โดยใช้ลิ้นชักกันกัมมันตภาพรังสีในห้องพักสูบบุหรี่และนอกห้องควบคุมกันปรมาณู ๑๗ ห้อง. ผลการตรวจไม่พบความแตกต่างทางสถิติของระดับความเข้มข้นก๊าซเรดอนระหว่างในและนอกห้องพักสูบบุหรี่ (ค่า $t = 0.498$). ความเข้มข้นของก๊าซเรดอนภายในอาคารทำอากาศยานอยู่ในช่วง ๘.๗-๗.๓ เบคเคอเรล/ลูกบาศก์เมตร (12.8 ± 2.8 บคร./ลบ.ม.) ซึ่งต่ำกว่าขีดระดับความปลอดภัย. คณะผู้รายงานสรุปว่าความเข้มข้นก๊าซเรดอนในอากาศทำอากาศยานกรุงเทพอยู่ในเกณฑ์ปลอดภัย และจากการตรวจห้องสูบบุหรี่ทุกห้องโดยวิธีที่ใช้ในการศึกษานี้ไม่พบระดับความเข้มข้นก๊าซเรดอนที่อาจเป็นอันตรายต่อผู้เข้าไปพักสูบบุหรี่.

คำสำคัญ: ห้องสูบบุหรี่, ทำอากาศยาน, เรดอนในอาคาร, พอลิเนียม-๒๑๐